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EPALIT: A Data Management System Applied to the Control and Retrieval of Technical Reports

by

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16. ABSTRACT

The EPALIT data management system is used by the EPA Environmental Research Laboratory, Gulf Breeze, FL, to preserve and manipulate information in text databases. EPALIT provides the logical resources for data organization, analysis, and retrieval. It is completely interactive and permits natural language searching with full or truncated terms, imbedded word fragments, and Boolean search strings. The library has applied this system to the control and dissemination of its information resources. The Contribution Database, consisting of the laboratory's in-house and extramural publications, is the most sophisticated application to date. EPALIT's features are described in the context of this Contribution Database and its various report formats illustrated.

17. KEY WORDS AND DOCUMENT ANALYSIS		
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The Environmental Research Laboratory in Gulf Breeze, Florida was established in 1970 as the Environmental Protectiona Agency's marine research center for pesticides and toxic substances. Its primary role is to provide the Agency with a scientific base for its regulatory decisions in those areas. Current research programs include developing toxicological test guidelines, determining the effects on marine ecosystems of exposure to toxic substances, and assessing the risks to aquatic environments from genetically altered microorganisms. In addition, the laboratory provides emergency technical assistance in evaluating environmental threats to the Gulf of Mexico and the tropical Atlantic coast. The Gulf Breeze library supports these research efforts by acquiring, organizing, and disseminating information and materials pertinent to the needs of laboratory personnel. In recent years, the library's performance has been enhanced by the use of an in-house data management system called EPALIT, an acronym for an EPA computerized resource for dealing with text (literature as data. This integration of computer technology with library functions has greatly expanded the role of the library and the services it can offer.

EPALIT's Development

The EPALIT Text Data Management System was developed for the laboratory by Computer Sciences Corporation. Its programs are written in FORTRAN IV and run on a DEC PDP 11/70 minicomputer with data stored on magnetic tape. EPALIT was designed to meet the need for a system capable of handling textual records containing variable length fields without imposing rigid limitations on content or format. It is has been used to formulate work plans, collect water quality data, track grants, manage property records, and generate project status reports.

The initial application of EPALIT to a library task was the creation of an on-line card catalog. The success of this project led to the development of other databases for the library's reprint collection, laboratory notebooks, and 35 mm slides. By far the most sophisticated and prolific of the library applications has been the Contribution Database--a catalog of the laboratory's in-house and extramural research publications. It is in the context of this database that EPALIT's features will be described.

Interactive Features

The Contribution Database can be accessed from anywhere by anyone having the necessary equipment and passwords. The integrity of the database is always fully protected, regardless of the number of people using it. The library staff sign on in a FULL authorization mode which makes available the complete range of EPALIT's interactive capabilities. Patrons sign on in a RESTRICTED mode which allows record retrieval, but does not permit any modification or deletion of database content. Confidential or extraneous information may also be masked from view in the RESTRICTED mode.

Like all EPALIT applications, the Contribution Database is menu-driven (see FIGURE 1). When operating in FULL mode, it offers the user the following choices: record input, record retrieval, or system termination. Records are added to the database by entering responses to a series of prompts (see FIGURE 2). Data elements of equal value (co-authors, multiple grant numbers, etc.) are separated by double back slashes. This convention causes the system to treat each element as a unique entry for indexing purposes. Once entered, records can be retrieved by searching a key field, a concatenation of all key fields, or the full text of the database. Key fields are data elements

```
                    ERLGB CONTRIBUTION SYSTEM
DO YOU WISH TO
SEARCH FOR A DOCUMENT BY:
                          OR
01: AUTHOR/YEAR                          06: ADD A DOCUMENT TO THE FILE
02: EPA REPORT NO/PROJECT NO/CAS NO      07: SEARCH BY RECORD FRAGMENT
03: TITLE                                08: SEARCH BY KEY CONTENTS ANALYSIS
04: GRANT NO/JOURNAL/DRAFT ID #          09:
05: CONTRIBUTION NO                      10: TERMINATE THE SYSTEM

? 6
```

Figure 1. Contribution Database - Option Menu.

```
NEW RECORD

ENTER AUTHOR :
ENTER TITLE :
ENTER JOURNAL :
ENTER YR :
ENTER VOL :
ENTER ISSUE :
ENTER PAGE NO :
ENTER EDITOR :
ENTER TITLE1 :
ENTER PUBLISHER :
ENTER CONTRIBUTION NO :
ENTER GRANT NO :
ENTER LAB PROJECT NO :
ENTER EPA REPORT NO :
ENTER ABSTRACT :
ENTER NOTES :
ENTER DRAFT ID # :
ENTER PUB TYPE :
ENTER DATE CONT # ASSIGNED :
ENTER CAS # :
ENTER ORDIS # :
ENTER REQ :
```

Figure 2. Contribution Database - Record Input Prompts.

which have been designated key access points (author, title, project officer, Chemical Abstracts Registry number, etc.) and can be changed as retrieval needs change. Search statements may consist of truncated terms or phrases, imbedded word fragments, or Boolean expressions. Search results are displayed one record at a time and may be browsed by hitting the return key. Modification or deletion of a record can take place only after it has been retrieved for viewing. The menu can be re-displayed at any time by entering a single command. Signing off is simply a matter of selecting the system termination option from the menu.

Print Output

As stated earlier, the Contribution Database is the most prolific of the library applications in terms of print output. Its various reports provide multiple access routes into the collection, enable management to track laboratory production, and inform the public of available research publications.

The simplest products of the database are the key field index reports. These indexes are derived from the key fields and each is arranged alpha-numerically by the indexed field. Record format was modelled after the bibliographies of the National Technical Information Service. Complete citations, document numbers, and notes are included in all indexes; abstracts, however, appear in the title index only. Indexed fields are highlighted to facilitate rapid scanning.

Several reports are generated through keyword analysis of selected fields. Analyses may be run against the entire database or against specific record subsets. They are usually run in the title and/or abstract fields as these exhibit the highest ratio of significant to trivial terms. Analyses are refined by stop- or go-lists which increase the utility of the reports produced. Truncated terms, consisting of root words with asterisk suffixes, can be used to populate these lists. For example, the

word "record" followed by an asterisk "*" is interpreted by the system as record, records, recorded, recording, and so on. Truncation streamlines the development of a stop/go-list, but must be used carefully to ensure that terms are not inadvertently excluded or included. Keyword reports vary in complexity from a straightforward listing of terms with document identifiers to a keyword-out-of-context index of abstract terms with a full paragraph of text surrounding each word. Keyword indexes function primarily as subject guides to the collection and usually lead directly to the source documents via the contribution numbers.

Directory reports are generated for public distribution and are the most structured products of the Contribution Database. They range in content from a selective listing of items chosen on the basis of author, subject, or grant number to a cumulative listing of every record in the database. The program which generates these reports can accommodate almost any type of publication: journal articles, book chapters, project reports, conference proceedings, as well as items still in preparation or in press. This program re-formats each record into a standard citation, omitting all non-bibliographic data except the contribution number and certain notes. Abstracts may be included or not as needed. Arrangement is flexible, but citations are typically grouped by author or publication year. Special input conventions can be used to control the arrangement of a list or to exclude certain publication types. Directory reports are usually supplemented with author and title keyword indexes. These indexes refer not to the document identification numbers, but to the pages on which citations appear in the directory. The author indexes contain every author, with joint authorship indicated. An internal name authority file aggregates all of an author's publications under one name in this index, regardless of the variant spellings encountered in the records themselves. Indexing to first author only can be substituted for full author indexing

amd is particularly useful with larger directories whose size can be prohibitive. The title indexes are keyword-in-context, the context being one line of surrounding text. Abstracts can be indexed along with the titles when comprehensive subject retrieval is required.

Special Reports

In addition to the indexes, keyword reports, and directories which are typical of many bibliographic databases, a variety of special reports are produced using EPALIT's analytical resources. Two of the most interesting of these are the Sentence Ranking Report and the Best Seller List.

The Sentence Ranking Report is derived from an analysis of the abstract field of a record or group of records. It uses the system's ability to distinguish the beginning and ending of sentences and to identify keywords within them. Sentences are evaluated on the basis of four objective criteria: aggregate character length of non-trivial terms, aggregate character length of all terms, number of non-trivial terms, and sentence position. Each of these measures is weighted according to its merit as an indicator of sentence value. This weight can be redistributed to shift the focus of the analysis as needed. Currently, the ratio of non-trivial characters to total characters is the primary ranking factor, followed by the number of non-trivial terms contained in the sentence, and its position in the abstract. Sentences can be ranked in either ascending or descending order of significance, depending on the intended use of the report. Sentences are grouped in abstract blocks which are identified by document number. Sentence Ranking Reports can be used to get at the "meat" of a group of publications (descending order) or to identify non-significant sentences for revision or deletion (ascending order).

The Best Seller List is just that--a list of the most requested items in the collection during a given month or year. It is derived from a field

containing monthly statistics on the number of reprint requests received by the library for each document. With this information, the system produces a citation list of the ten publications having the highest number of requests during the indicated period. This report can be used by management to identify areas of growing concern for future research projects.

Conclusion

The Contribution Database, backed up by the extensive and flexible resources of the EPALIT Data Management System, has moved the library from a peripheral location in the laboratory to a central position. The library is seen by management and research staff as an information handling and producing facility, not just a repository for books. The system makes it possible for the library to respond to any laboratory information request rapidly, accurately, and, when necessary, with a very polished product. It enables the library to provide resources which can not be acquired anywhere else--tools for tracking laboratory production, tools for responding quickly to emergency requests, tools for making the laboratory's research highly visible to top level administrators and to the public. This database and the other EPALIT applications are anchors which help secure the library's place in the Gulf Breeze laboratory.

Sample Reports

The following samples are included to illustrate some of the report formats currently in use at the Gulf Breeze library. These are not all of the reports generated from the Contribution Database, but are representative of the different indexes, keyword analyses, and directories available. The system is flexibile enough to allow modification of existing formats and creation of new ones as needed.

ROSETTE GLANDS IN THE GILLS OF THE GRASS SHRIMP, PALAEMONETES PUGIO. I. COMPARATIVE MORPHOLOGY, CYCLICAL ACTIVITY, AND INNERVATION
DOUGHTIE, DANIEL G., AND K. RANGA RAO
J. MORPHOL. 171(1):41-67. 1982. EPA-600/J-82-150
DRILLING FLUID//CR807417 Q203 D225
PB82-207846, PC- A03
ERLGB X238

TWO TYPES OF EXOCRINE ROSETTE GLANDS (CALLED TYPE A AND TYPE B), LOCATED IN THE GILL AXES OF THE GRASS SHRIMP, PALAEMONETES PUGIO, ARE DESCRIBED. THE TYPE A GLANDS ARE EMBEDDED WITHIN THE LONGITUDINAL MEDIAN SEPTUM OF THE GILL AXES, WHEREAS THE TYPE B GLANDS TYPICALLY PROJECT INTO THE EFFERENT HEMOLYMPH CHANNELS OF THE GILL AXES. ALTHOUGH BOTH GLANDS HAVE CERTAIN COMMON CHARACTERISTICS (I.E., A VARIABLE NUMBER OF RADIALLY ARRANGED SECRETORY CELLS, A CENTRAL INTERCALARY CELL, AND A CANAL CELL THAT FORMS THE CUTICULAR DUCTULE LEADING TO THE BRANCHIAL SURFACE), THEY DIFFER IN THE FOLLOWING RESPECTS. THE TYPE B GLAND IS INNERVATED, BUT THE TYPE A GLAND IS NOT; AXONAL PROCESSES, CONTAINING BOTH GLANDULAR (CA. 900-1300 A) AND AGRANULAR (CA. 450-640 A) VESICLES, OCCUR AT A JUNCTURE BETWEEN ADJACENT SECRETORY CELLS AND THE CENTRAL CELL OF THE TYPE B GLAND. THE SECRETORY CELLS OF TYPE A AND TYPE B GLANDS DIFFER IN THEIR SYNTHETIC POTENTIAL AD MEMBRANE SPECIALIZATIONS. THESE DIFFERENCES ARE MORE PRONOUNCED IN WELL-DEVELOPED, MATURE GLANDS, MOST FREQUENTLY ENCOUNTERED IN LARGER (24-28 MM, TOTAL LENGTH) GRASS SHRIMP, THAN IN THE UNDERDEVELOPED, IMMATURE GLANDS THAT ARE MOST ABUNDANT IN SMALLER (14-18 MM, TOTAL LENGTH) GRASS SHRIMP. THUS, IN MATURE GLANDS, THE SECRETORY CELLS OF THE TYPE A ROSETTE GLANDS ARE CHARACTERIZED BY EXTENSIVE RER, ABUNDANT GOLGI, AND NUMEROUS SECRETORY GRANULES, WHEREAS THE SECRETORY CELLS OF THE TYPE B GLAND ARE CHARACTERIZED BY EXTENSIVELY INFOLDED AND INTERDIGITATED BASAL PLASMALEMMAS AND BY THE PRESENCE OF NUMEROUS MITOCHONDRIA. IN GENERAL, BOTH TYPES OF GLANDS EXHIBIT INCREASED SECRETORY ACTIVITY SOON AFTER ECDYSIS. THE CENTRAL AND CANAL CELLS IN BOTH GLANDS SEEM TO HAVE A ROLE IN THE MODIFICATION OF THE SECRETED MATERIALS. THE POSSIBLE FUNCTIONS ASSIGNED TO THE TYPE A GLAND AND THE TYPE B GLAND INCLUDE PHENOL-OXIDASE SECRETION AND OSMOREGULAION, RESPECTIVELY.

ROUND-ROBIN ACUTE TOXICITY TESTS WITH SEVEN CHEMICALS AND LARVAE OF THE EASTERN OYSTER (CRASSOSTREA VIRGINICA) (UNPUBLISHED REPORT)
BORTHWICK, PATRICK W., AND JOHN E. ALLEN
U.S. ENVIRONMENTAL PROTECTION AGENCY, ENVIRONMENTAL RESEARCH LABORATORY, GULF BREEZE, FL. 1981. 21 P.
Q089,Q236
ERLGB 187

THIS REPORT CONTAINS THE RESULTS OF OYSTER LARVAL TOXICITY TESTS CONDUCTED AT THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S (EPA) GULF BREEZE LABORATORY WITH SEVEN TEST COMPOUNDS. THE STATIC OYSTER LARVAL TEST WAS ONE OF SEVEN MARINE TOXICITY TESTS CHOSEN FOR ROUND-ROBIN COMPARISON BY THE OFFICE OF RESEARCH AND DEVELOPMENT'S MARINE ENVIRONMENTAL RESEARCH LABORATORIES. THE DATA PRESENTED HERE WILL BE ANALYZED AND COMPARED WITH RESULTS GENERATED IN OTHER GOVERNMENT AND CONTRACT LABORATORIES WHICH PARTICIPATED IN THE INTERLABORATORY COMPARISON, OR ROUND-ROBIN.

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EPA-600/3-76-048 124 168 229 222 156-
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MIRRORS
X303

MISCELLANEOUS
X165- X368

MISIDENTIFIED
X052-

MISLEADING
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COUCH, JOHN A., LEE A. COURTNEY, AND STEVEN S. FOSS. 1981. **LABORATORY EVALUATION OF MARINE FISHES AS CARCINOGEN ASSAY SUBJECTS.** IN: PHYLETIC APPROACHES TO CANCER: PROCEEDINGS OF THE 11TH INTERNATIONAL SYMPOSIUM OF THE PRINCESS TAKAMATSU CANCER RESEARCH FUND, TOKYO, 1980. CLYDE J. DAWE, EDITOR, JAPAN SCIENTIFIC SCIENCES PRESS, TOKYO, JAPAN. PP. 125-139. (ERL,GB 171).

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IDENTIFICATION : **EPA-600/3-83-021**

TOXICITY OF USED DRILLING FLUIDS TO EMBRYO DEVELOPMENT WAS INVESTIGATED TO ASCERTAIN THE LIMITS OF SAFE USAGE OF THESE FLUIDS IN MARINE ENVIRONMENTS.

OTHERS ARE RELATIVELY INNOCUOUS, REQUIRING VERY LITTLE DILUTION TO ACHIEVE A CONCENTRATION IN WHICH EMBRYO DEVELOPMENT CAN PROCEED NORMALLY.

STUDIES DEMONSTRATED THAT NO SINGLE DRILLING FLUID IS "TYPICAL" AND THAT THE QUANTITATIVE EFFECTS OF EMBRYOS VARY CONSIDERABLY FROM ONE FLUID TO ANOTHER.

IN ADDITION, SEVERAL COMMERCIAL DRILLING FLUID COMPONENTS WERE EXAMINED IN THE TEST SYSTEMS INCLUDING A SYNTHETIC REFERENCE MUD.

THIS VARIABILITY IS NOT MENTIONED TO SUGGEST THE ACTIVE COMPONENTS, OF WHICH WE HAVE NO KNOWLEDGE, BUT ONLY TO ILLUSTRATE THE "NON-TYPICAL" NATURE OF ANY ONE SAMPLE.

THE DRILLING FLUIDS TESTED CAME FROM VARIOUS SOURCES; 24 DIFFERENT SAMPLES WERE EVALUATED.

SOME DRILLING FLUIDS ARE QUITE TOXIC TO ONE OR MORE OF THE EMBRYO SYSTEMS, REQUIRING DILUTIONS OF OVER 10(5) TO BECOME "SAFE".

IDENTIFICATION : **EPA-600/4-81-031**

THE BIOMASS MEASURED BY THE EXTRACTABLE PHOSPHOLIPID AND THE TOTAL LIPID PALMITIC ACID SHOWED EXCELLENT CORRELATION WITH THE FATTY ACID "SIGNATURES" CHARACTERISTIC OF BACTERIA, BUT SHOWED A LOWER CORRELATION WITH THE LONG-CHAIN POLYENOIC FATTY ACIDS CHARACTERISTIC OF THE MICROFAUNA.

STUDIES WITH TERRESTRIAL PLANTS IN LABORATORY AND FIELD EXPERIMENTS SHOW THAT THE FLUIDS AND SOME FLUID COMPONENTS EXHIBIT PHYTOTOXICITY PROPERTIES REDUCING SEED GERMINATION, GROWTH AND YIELD.

INTRODUCTION INTO THE ENVIRONMENT OF THE CHEMICALLY COMPLEX FLUIDS HAS PROMPTED EFFECTS RESEARCH ADDRESSING TERRESTRIAL AND FRESHWATER HABITATS AND THEIR RESPECTIVE BIOLOGICAL COMPONENTS.

THE FLUIDS PERFORM A MULTIPLICITY OF FUNCTIONS, RANGING FROM LUBRICATING TO PREVENTION OF BLOWOUTS WHEN ENCOUNTERING HIGH PRESSURE.

THE RANGE OF LETHAL CONCENTRATIONS OF FLUID COMPONENTS IN TOXICITY STUDIES WAS FROM LESS THAN 1 TO 75,000 MG/L AND THAT FOR WHOLE DRILLING FLUIDS FROM 0.29 TO 85% BY VOLUME.

PREFERENCE/AVOIDANCE REACTIONS OBSERVED IN EXPERIMENTS WITH WHOLE DRILLING FLUIDS ARE ALSO COLLATED AND DISCUSSED.

DRILLING FLUIDS REPRESENT AN IMPORTANT ASPECT OF OFFSHORE AND LAND BASED DRILLING OPERATIONS.

PHYTOTOXICITY IN WHOLE DRILLING FLUIDS IS ATTRIBUTED TO SOLUBLE SALT CONCENTRATIONS.

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